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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/063,845	05/17/2002	Yudong Zhu	122016	7980

6147 7590 04/23/2003

GENERAL ELECTRIC COMPANY  
GLOBAL RESEARCH CENTER  
PATENT DOCKET RM. 4A59  
PO BOX 8, BLDG. K-1 ROSS  
NISKAYUNA, NY 12309

EXAMINER
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SHRIVASTAV, BRIJ B

ART UNIT	PAPER NUMBER
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2859

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/063,845

Applicant(s)

ZHU, YUDONG

Examiner

Brij B Shrivastav

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 30 December 1899.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-4, 8, 9, and 11-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Mistic (US 6,040,697).

As regards to claims 1 and 8, Mistic teaches an array of radio frequency (RF) coil assembly and a method for magnetic resonance imaging using this multiple transmit coil system (figure 4; columns 4 and 5, lines 36-67 and 1-34, respectively). Further, Mistic teaches the coil system with a plurality of transmission coils arranged in parallel (figure 4, numerals 64 and 68), and a plurality of corresponding RF amplifiers each coupled to a corresponding coil of the system to generate controlled current in the coils to define and steer an excitation volume of a subject within the MRI system (figure 5, numerals 64, 68, and 110; column 5 and 6, lines 34-67 and 1-19, respectively).

As regards to claim 2-4 and 9, Mistic further teaches arrangement of RF coils in the coil system being in a linear pattern, having substantially even and circular distribution about the subject and the transmit coils to transmit in parallel to accelerate a multidimensional excitation (figures 4 and 5, the even and circular distribution of the coils about the subject is inherent in such a coil system).

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As regards to claims 11-15, Misic further teaches reception of the magnetic resonance signals by at least one receiving coil (figure 3, numerals 12 and 14), use of body or surface coil to receive the signal (figures 3 and 4, numerals 12, 14, 64 and 68), use of phased-array coils to receive the signal (see abstract), and the coil array used for RF frequency transmission is also further used to receive the MR signal, and the receive coil is configured for performing parallel acquisition (figure 4).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 5-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Misic (US 6,040,697), and further in view of Pauly (US 4,985,677).

As regards to claims 5-7 and 10, Misic does not further teach: a) the current control in each of the coil in the transmit coil array assembly by the RF waveform is designed along with the gradient waveforms, b) the wave forms are designed to effect shorter time-spin excitation k-space, which is related to the means of reducing excitation k-space sampling density, and c) the coil assembly design is based on computing wave forms based on the desired shape and location of an excitation volume and the profiles of the RF fields related to the component coils. Pauly teaches the current control by the RF wave form in each of the coil in the transmit coil array assembly is designed along with the gradient waveforms, and the wave forms are designed to effect shorter time-

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spin excitation k-space related to the means of reducing excitation k-space sampling density, and the coil assembly design is based on computing wave forms based on the desired shape and location of an excitation volume and the profiles of the RF fields related to the component coils, (figures 3-8, and 16; column 2, lines 14-45, columns 6, 7 and 8, lines 33-68, 1-31, 46-65 and 1-27, respectively). It would have been obvious to one of ordinary skill in the art to combine teachings of Pauly related to the shape and design of the excitation waveform with the invention of Misic to improve image quality by decreasing artifacts, and at the same time reducing imaging time.

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brij B Shrivastav whose telephone number is 703-305-0649. The examiner can normally be reached on 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F. F. Gutierrez can be reached on 703-308-3875. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-304-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-0956.

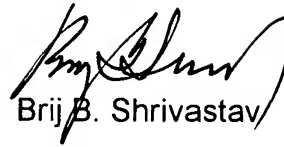
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Bbs

April 21, 2003

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Brij B. Shrivastav

Patent Examiner